



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.		
10/661,632	09/15/2003	Chung-Sam Jun	253/033	7928		
27849	7590	03/05/2008	EXAMINER			
LEE & MORSE, P.C. 3141 FAIRVIEW PARK DRIVE SUITE 500 FALLS CHURCH, VA 22042				PATEL, JAYESH A.		
ART UNIT		PAPER NUMBER				
2624						
MAIL DATE		DELIVERY MODE				
03/05/2008		PAPER				

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/661,632	JUN ET AL.
	Examiner	Art Unit
	JAYESH A. PATEL	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 18 January 2008.
- 2a) This action is **FINAL**.                                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
  - 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-13 and 18-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 15 September 2003 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

## DETAILED ACTION

### ***Response to Amendment***

1. The Amendment dated 01/18/2008 has been entered.
2. The arguments are moot in view of the amendments.
3. Applicants amendment initiated new grounds of rejections and therefore new grounds of rejections are presented below.
4. Claims 14-17 are cancelled.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 , 6, 9 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Montillo et al. (US 6647132) hereafter Montillo.

5. Regarding Claim 1, Montillo discloses a method for analyzing a sample (Figs 1,3) by employing a Fast Fourier Transformation method, comprising: generating an image of a region of the sample to be analyzed (Fig 1 elements 116 generating an image of a sample 112, Col 4 Lines 6-7); generating data

having a frequency from a plurality of portions (**sub-regions at Col 6 lines 33-34**) of the image by the Fast Fourier Transformation method (**at Col 6 lines 56-58 and Col 7 Lines 24-25**); and determining whether the region is normal or abnormal (**identifying regions of similar structure (normal) from within regions of non-similar (abnormal) texture at Col 4 Lines 42-43**) based on a comparison of portions of the data generated by the fast fourier transformation method without using a separate reference sample at (**Col 9 Lines 24-40 where the comparing frequency spectrum between the sub-regions is performed within the same sample and no reference frequency or sample image is used for the comparison.**).

6. Regarding Claim 2, Montillo discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1, wherein the region includes a periodically formed pattern as shown in (**Fig 5 Elements 506 is a periodic frequency spectrum of the region 504**).

7. Regarding Claim 6, Montillo discloses the method for analyzing a sample by employing a Fast Fourier transformation method as claimed in claim 1. Montillo discloses further comprising defining the image into at least two pixel units at (**Col 4 lines 8 and as seen in figure 1 and 2 where the images are two dimensional and are made up of pluralities of pixels**).

**8.** Claim 9 is a corresponding apparatus claim of Claim 1. See the explanation of Claim 1.

**9.** Regarding Claim 18, Montillo discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo further discloses wherein analyzing the generated data includes using solely the data generated from the image as in (figs 1,2 and Col 6 Lines 56-58).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montillo in view of Russell (US 6731824) hereafter Russell.

**10.** Regarding Claim 3, Montillo discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo discloses the image of the semiconductor wafer as seen in fig 1 and the periodic pattern as seen in Fig 5 element 506. Montillo is however silent and does not

disclose, wherein the region is formed on a semiconductor substrate and corresponds to a cell region including a periodic pattern.

Russell discloses wherein the region is formed on a semiconductor substrate and corresponds to a cell region (**many single regular circuit structures forming a cell**) including a periodic pattern in (**Figs 2, 6 and Col 5 Lines 63-64**). Russell discloses that the method and system is fully automatic, fine tunable at (**Col 2 Lines 47-48**). Montillo and Russell are from the same field of endeavor and are analogous art, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Russell in the method and system of Montillo for the above reasons.

**11.** Regarding Claim 4, Montillo and Russell discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as Claimed in claim 3. Russell further discloses wherein the periodic pattern has a line width (**edges of the single regular circuit structure in fig 2**) and is formed by an etching process.

**12.** Regarding Claim 5, Montillo discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo also discloses that the image is captured by the video camera as seen in Fig 1. Montillo however is silent and does not disclose wherein the image is generated by a scanning electron microscope.

Russell discloses in wherein the image is generated by a scanning electron microscope at (**Fig 1A step 100 and Col 4 Lines 22-27**).

**13.** Regarding Claim 7, Montillo discloses the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 1. Montillo is silent and however does not disclose further comprising providing an alarm when the region is abnormal.

Russell discloses further comprising providing an alarm (**automatically switching from regular display to the resulting visualized image with defects**) when the region is abnormal at (**Col 5 Lines 50-64**). Russell discloses automatically switching of the display from original to the defect image display indicates displaying the alarm condition.

Claims 8,10-11, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al. (US 6326618) hereafter Kane in view of Montillo.

**14.** Regarding Claim 8, Kane discloses a method (Figs 2A-2d) for analyzing a sample by employing a Fast Fourier Transformation method, comprising: generating a magnified image (**magnification controller 138 Fig 2C**) of a minute pattern formed in a cell region of a semiconductor substrate and measuring a line width of the minute pattern using the magnified image at (**Col 4 Lines 39-67, Col 5 Lines 1-40 and Col 6 Lines 50-55**). Kane further disclose

that a well tuned (**using magnification control 138**) SEM produced a 276 nanometer line width while an untunned SEM produced a line width of 283 nanometers and thus providing the width accuracy in the nanometer ranges, critical in the semiconductor industry at (**Col 5 lines 3-12**). Kane discloses fast fourier transforms of the wafer image and autocorrelation (**between the same image i.e without using the reference sample**) at **Col 11 Lines 47-61**). Kane is silent and however does not disclose generating data having a frequency from a plurality of portions of the image by the Fast Fourier Transformation method; and determining whether the region is normal or abnormal based on a comparison of portions of the data generated by the Fast Fourier Transformation method without using a separate reference sample.

Montillo discloses generating data having a frequency from a plurality of portions (**sub-regions at Col 6 lines 33-34**) of the image by the Fast Fourier Transformation method (**at Col 6 lines 56-58 and Col 7 Lines 24-25**); and determining whether the region is normal or abnormal (**identifying regions of similar structure (normal) from within regions of non-similar (abnormal) texture at Col 4 Lines 42-43**) based on a comparison of portions of the data generated by the fast fourier transformation method without using a separate reference sample at (**Col 9 Lines 24-40 where the comparing frequency spectrum between the sub-regions is performed within the same sample and no reference frequency or sample image is used for the comparison.**).

Montillo discloses that the method and system as disclosed is automatic and fine

tunable at (Col 2 Lines 47-48). Kane and Montillo are from the same field of endeavour and are analogous art, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Montillo in the method and apparatus of Kane fro the above reasons.

**15.** Regarding Claim 10, Kane and Montillo, discloses the apparatus for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 9. Kane discloses wherein the image generation part includes a scanning electron microscope as seen in (Fig 2C and Col 10 lines 64-65).

**16.** Regarding Claim 11, Kane and Montillo disclose the apparatus for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 9. Kane discloses further comprising a display part for displaying the generated data at (Col 12 Lines 7-8 for displaying the pixels or image). Montillo discloses (fig 1 element 126 which is a input –output system which includes a display). Also the images are being displayed as seen in figs 2.

**17.** Claim 13 is a corresponding apparatus claim of claim 8. See the explanation of Claim 8.

**18.** Regarding Claim 20 see the explanation of Claim 13 and the **(magnification control unit 138 Fig 2C)** in Kane. The magnification controller 138 in Fig 2c generates a magnified image and the image data used afterwards is magnified.

Claims 12, 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kane in view of Montillo and in further view of Russell

**19.** Regarding Claim 12, Kane and Montillo disclose the apparatus for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 9. Kane and Montillo are silent and however do not disclose further comprising an alarm part for providing an alarm when the region is abnormal.

Russell discloses further comprising providing an alarm **(automatically switching from regular display to the resulting visualized image with defects)** when the region is abnormal at **(Col 5 Lines 50-64)**.

Russell discloses automatically switching of the display from original to the defect image display indicates displaying the alarm condition. Russell discloses that the method and system is fully automatic, fine tunable at **(Col 2 Lines 47-48)**. Kane, Montillo and Russell are from the same field of endeavor and are analogous art, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Russell in the method and apparatus of Kane and Montillo for the above reasons.

20. Regarding Claim 19, Kane and Montillo disclose the method for analyzing a sample by employing a Fast Fourier Transformation method as claimed in claim 8. Kane discloses measuring the line width and displaying (after generation of the data) as seen in Fig 11. Russell further discloses that the present invention provides a quick approximately 2-3 seconds method and apparatus for detecting the irregularities at **(Col 5 Lines 62-64)**. This shows that the measurement for the line width (edges) and displaying is done simultaneously.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jayesh Patel  
02/26/08

JINGGE WU  
SUPERVISORY PATENT EXAMINER